

REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 16, 17, 20-23 and 28-33 are presented for consideration. Claims 16, 17, 20 and 28-32 are independent. Claims 1-15, 18, 19 and 24-27 have been canceled without prejudice or disclaimer. Claims 16, 17 and 20-23 have been amended to clarify features of the subject invention, while claims 28-33 have been added to recite additional features of the subject invention. Support for these changes and these claims can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants note with appreciation that claims 20-27 were allowed over the art of record. Applicants submit that the foregoing changes to independent claim 20, and to claims 21-23 depending therefrom, do not affect the allowability of these claims. Therefore, claims 20-23 should remain allowable at the outset. In addition, dependent claims 24, 26 and 27, previously depending from independent claim 20, have been rewritten as new independent claims 28-30, respectively. Applicants submit that these claims likewise should be deemed allowable at the outset.

Applicants request favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 1-15 were rejected under 35 U.S.C. § 101 as claiming the same invention as that of claims 1-15 of U.S. Patent No. 6,614,535 to Kakuchi et al. To expedite prosecution,

Applicants have simply canceled claims 1-15 without prejudice or disclaimer. Accordingly, this rejection has become moot and should be withdrawn.

Claims 16-19 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,614,535 to Kakuchi et al. This rejection is respectfully traversed. Nevertheless, Applicants submit that independent claims 16, 17, 20 and 28-32, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the present invention, independent claim 16 recites an exposure method including the steps of illuminating a reticle, by use of light from an exposure light source, projecting a pattern of the reticle onto an object to be exposed, by use of a projection optical system, and measuring an optical characteristic of the projection optical system by use of an interferometer and on the basis of light from the exposure light source. The measuring step includes a step for dividing light passed through the projection optical system into two light beams and for causing interference of the two light beams.

In another aspect of the present invention, independent claim 17 recites a device manufacturing method including the steps of preparing a reticle, illuminating the reticle, by use of light from an exposure light source, projecting a pattern of the reticle onto an object to be exposed, by use of a projection optical system, and measuring an optical characteristic of the projection optical system by use of an interferometer and on the basis of light from the exposure light source. The measuring step includes a step for dividing light passed through the projection optical system into two light beams and for causing interference of the two light beams.

In a further aspect of the present invention, independent claim 31 recites a projection exposure apparatus including a projection optical system for projecting a pattern of a reticle, illuminated with light from a light source, onto an object to be exposed, and an interferometer for measuring an optical characteristic of the projection optical system by use of light from the light source. The interferometer is one of a radial shear type, a lateral shear type and a Twyman-Green type.

In still another aspect of the present invention, independent claim 32 recites a projection exposure apparatus including a projection optical system for projecting a pattern of a reticle, illuminated with light from a light source, onto an object to be exposed, and an interferometer for measuring an optical characteristic of the projection optical system by use of light from the light source. The interferometer includes an optical element for dividing light passed through the projection optical system into two light beams.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 16, 17, 31 and 32.

The Kakuchi et al. patent relates to a projection exposure apparatus that includes an exposure light source, an illumination system for illuminating a pattern, formed on a first object, with light from the exposure light source and passing through the illumination system, a projection optical system for projecting the pattern, as illuminated with light, onto a second object for exposure of the second object with the pattern, and an interferometer for use in measurement of an optical characteristic of the projection optical system. The interferometer is operable to perform the measurement by use of light from the exposure light source.

Applicants submit, however, that claims 1-15 of the Kakuchi et al. patent do not teach or suggest salient features of Applicants' present invention, as recited in independent claims 16, 17, 31 and 32, for example. Notably, claims 1-15 of the Kakuchi et al. patent do not teach or suggest a measuring step including a step of dividing light passed through a projection optical system into two light beams and for causing interference of the two light beams, as in the present invention recited in independent claims 16 and 17. Likewise, claims 1-15 of the Kakuchi et al. patent do not teach or suggest an interferometer for measuring an optical characteristic of a projection optical system by use of light from a light source, in which the interferometer is one of a radial shear type, a lateral shear type and a Twyman-Green type (as recited in independent claim 31) or an interferometer that includes an optical element for dividing light passed through a projection optical system into two light beams (as recited in independent claim 32).

Accordingly, Applicants submit that the noted claims of the Kakuchi et al. patent do not teach or suggest many features of the present invention, as recited in independent claims 16, 17, 31 and 32.

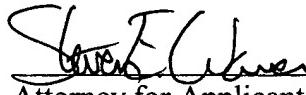
For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 16, 17, 20 and 28-32, is patentably defined over the cited art.

Dependent claims 21-23 and 33 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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